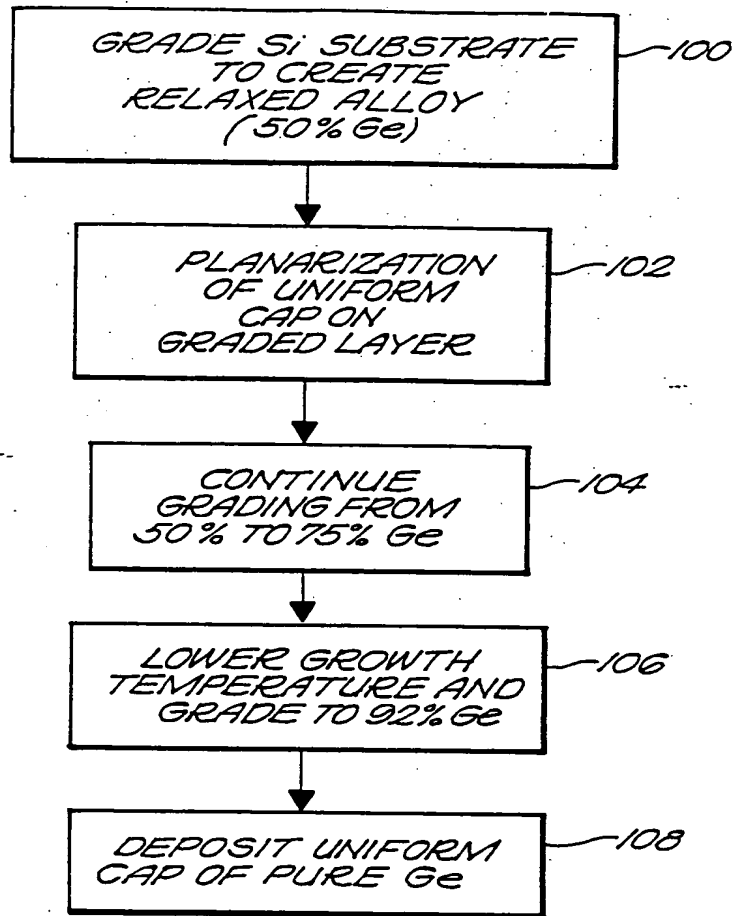


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**FIG. 1**

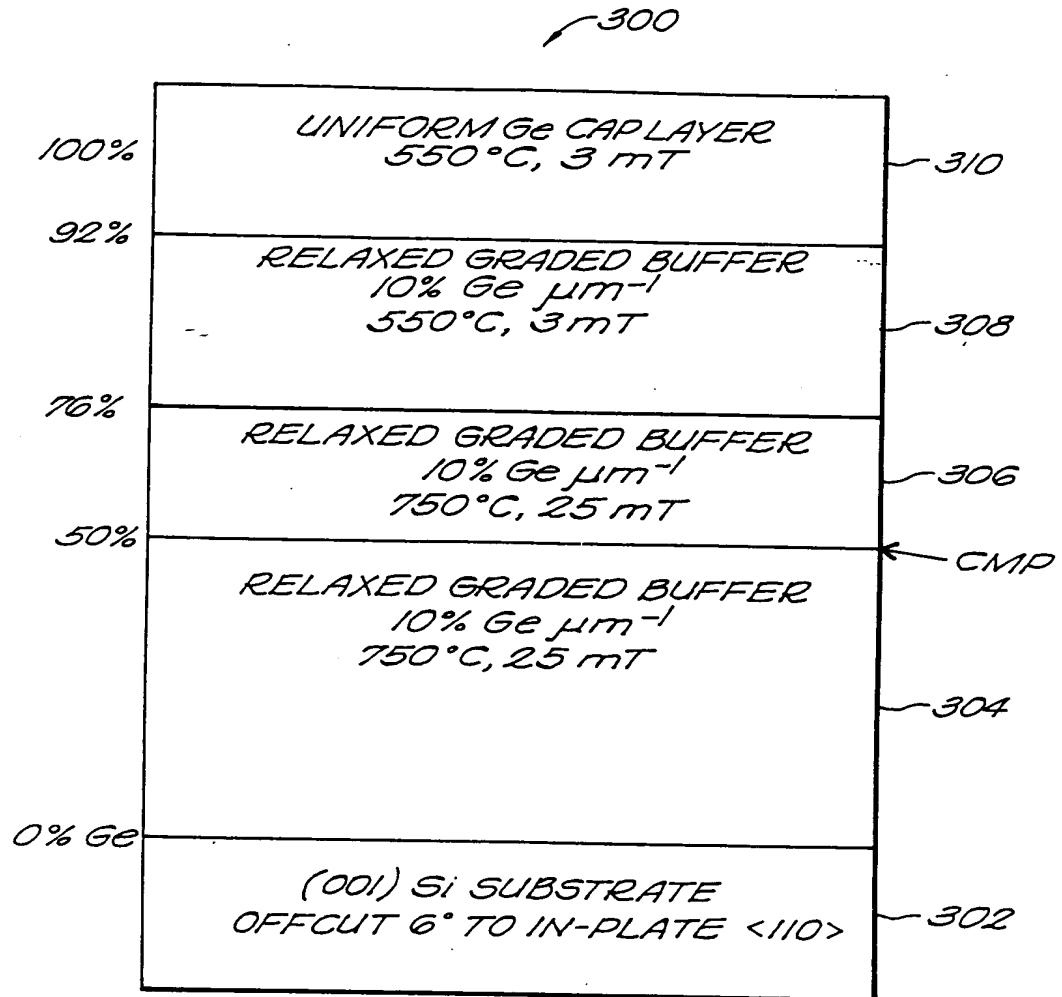
2/5

	SAMPLE A	SAMPLE B	SAMPLE C	SAMPLE D
FINAL Ge COMPOSITION	100 %	100 %	50 %	100 %
GRADING RATE (% Ge $\mu\text{m}^{-1}$ )	5	10	10	10
TOTAL EPITAXIAL THICKNESS ( $\mu\text{m}$ )	23	12	6.5	12
GROWTH TEMPERATURE ( $^{\circ}\text{C}$ )	750	800	750	50-76%: 750 76-100%: 550
GROWTH PRESSURE (mT)	25	50	25	50-76%: 25 76-100%: 3
CMP AT 50%	NO	NO	—	YES
THREADING DISLOCATION DENSITY ( $\text{cm}^{-2}$ )	$1 \pm 0.1 \times 10^7$	$1-5 \times 10^7$	$6.3 \pm 0.1 \times 10^6$	$2.1 \pm 0.2 \times 10^6$
CRACK DENSITY ( $\text{cm}^{-1}$ )	$47 \pm 5$	0	0	0
PARTICLE DENSITY ( $\text{cm}^{-2}$ )	$1250 \pm 100$	$600 \pm 40$	$50 \pm 5$	$150 \pm 10$
RMS ROUGHNESS (nm)	35.9	47	37.3	24.2
$\alpha_{\perp}$ OF TOP LAYER ( $\text{\AA}$ )	5.6559	5.6558	5.5327	5.6597
$\alpha_{\parallel}$ OF TOP LAYER ( $\text{\AA}$ )	5.6559	5.6552	5.5352	5.6409

GROWTH PARAMETERS AND CHARACTERIZATION RESULTS  
OF SAMPLES A-D

**FIG. 2**

205220" 6892200T

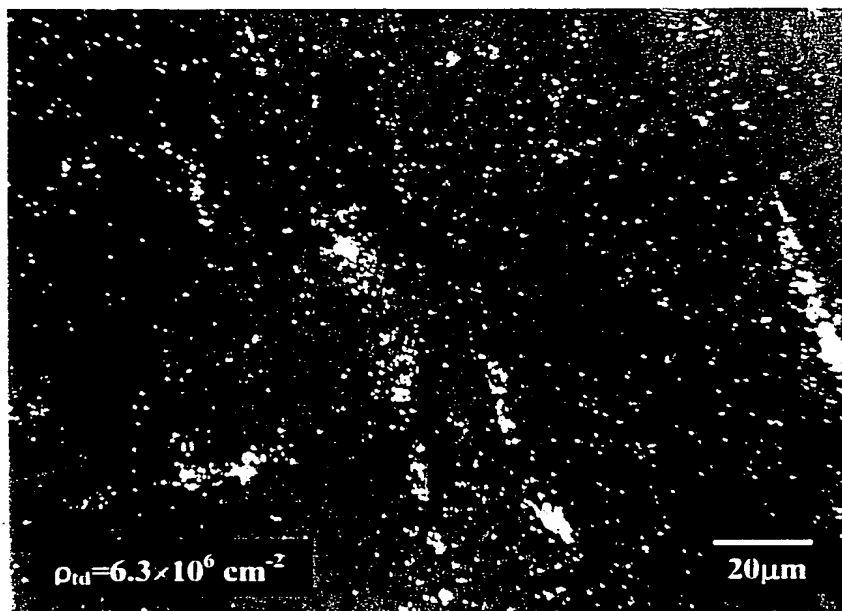
**FIG. 3**

205220" 6892200T

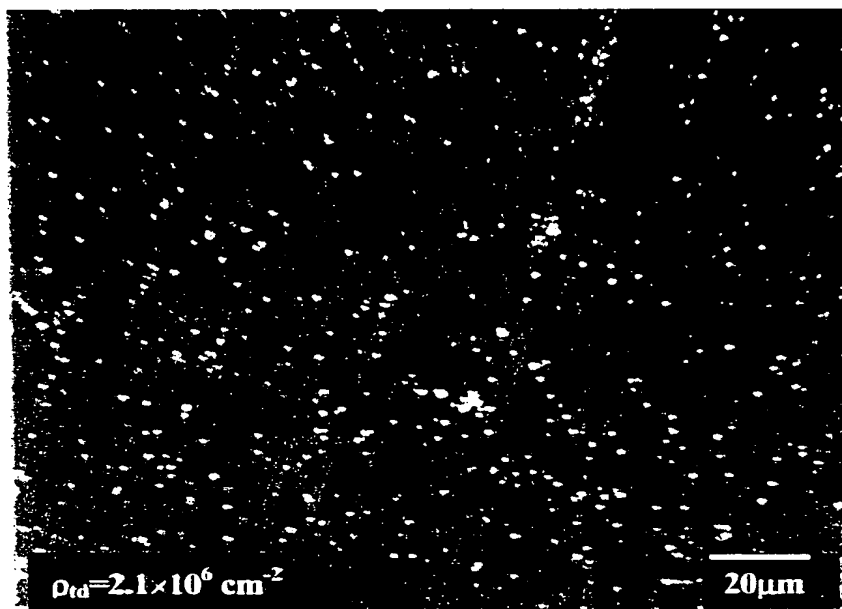


*FIG. 4*

205220" 6892200T



*FIG. 5A*



*FIG. 5B*